ritory have been much swollen during the month. At the close of the month the lowlands in the southern part of this city were flooded. At Ogden several dams were swept away, entailing losses estimated at \$6,000. Numerous washouts occurred on the Union Pacific railroad. The Denver and Rio Grande railroad in southeastern Utah was flooded and no trains from Denver arrived after the 28th. The water in Great Salt Lake reached a greater height than has been known for many years.

Nephi, Juab county: the railroad bridge at the forks of Salt

creek was washed away on the 9th.

West Virginia.—Wheeling: on the 13th the southeastern part of Jackson county, in this state, was visited by a severe storm which caused heavy losses to the farmers along the creek bottoms. Several dwellings and bridges and numerous barns are reported to have been washed away. The orchards and newly planted fields were also seriously damaged.

#### RAIN FROM A CLOUDLESS SKY.

Key West, Florida: from 9.45 to 10 p. m. of the 28th, a light rain fell when no cloud was visible except near the western horizon.

#### HIGH TIDES.

Eastport, Maine: 11th and 27th.

### VERIFICATIONS.

### INDICATIONS.

The detailed comparison of the tri-daily indications for May, 1884, with the telegraphic reports of the preceding twenty-four hours, shows the general average percentage of verifications to be 81.54 per cent. The percentages for the four elements are: Weather, 87.43; direction of the wind, 75.81; temperature, 79.52; barometer, 86.22 per cent. By geographical districts, they are: For New England, 79.66; middle Atlantic states, 84.35; south Atlantic states, 84.25; eastern Gulf, 83.93; western Gulf, 84.90; lower lakes, 79.92; upper lakes, 78.04; Ohio valley and Tennessee, 81.80; upper Mississippi valley, 78.35; Missouri valley, 78.65; north Pacific, 86.29; middle Pacific, 87.10; south Pacific, 89.52. There were three omissions to predict out of 3,137, or 0.09 per cent. Of the 3,134 predictions that have been made, seventy-eight, or 2.49 per cent., are considered to have entirely failed; one hundred and fifty-two, or 4.85 per cent., were one-fourth verified; four hundred and thirty-six, or 13.91 per cent., were one-half verified; six hundred and seventy-four, or 21.51 per cent., were three-fourths verified; 1,794, or 57.24 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

#### CAUTIONARY SIGNALS.

During May, 1884, two hundred and sixty-six cautionary signals were ordered. Of these, one hundred and ninety-seven, or 74.06 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. Fifty-eight cautionary off-shore signals were ordered, of which number forty-six, or 79.31 per cent., were fully justified, both as to direction and velocity; forty-eight, or 82.76 per cent., were justified as to velocity; and forty-nine, or 84.48 per cent., were justified as to direction. Three hundred and twenty-four signals of all kinds were ordered, two hundred and forty-three, or 75.0 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Of the above cautionary off-shore signals, fifty-four were changed from cautionary; no northwest signals were ordered. Five signals were ordered late. In eighty-seven cases winds of twenty-five miles or more per hour were reported for which no signals were ordered.

Prof. T. C. Mendenhall, director of the "Ohio Meteorological Bureau," in his report for May, 1884, makes the following

statement:

In the matter of railway weather signals the percentage of verification for the month is: for temperature, 93; and for state of the weather, 78, the mean being 85.5. For May of last year the percentage of verification was reported as 75, and a gain of more than 10 per cent. is shown.

Arrangements are now nearly completed for placing the system of car signals upon the two divisions of the Hocking Valley and Columbus and Toledo Railway. It is expected to have the system in successful operation before the end of June, and efforts will be continued to secure permission to place the signals on the cars of other lines of railway.

## TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors during May, 1884, with the average depth at which the observations were made and the mean temperature of the air at the various stations, are given in the table below. The highest water temperatures, 86°.5 and 81°.3 were reported from Key West, Florida, and Savannah Georgia, and occurred on the 21st and 25th respectively, the lowest, 32°.9 occurred at Buffalo, New York, on the 2d. The smallest monthly range, 2°.9 occurred at Eastport, Maine; the greatest, 24°.1, occurred at Buffalo, New York. Observations were interrupted by ice at Duluth, Minnesota from the 1st to 11th, and at Marquette, Michigan on the 5th. On account of breakage of instruments no observations were made at San Francisco, California and Fort Canby, Washington Territory, from the 1st to 15th.

Temperature of water for May, 1884.

Atlantic City, New Jersey 66.0 Alpena, Michigan 60.5 Algena, Michigan 60.5 Baltimore, Maryland 68.5 Baltimore, Maryland 68.5 Baltimore, Maryland 68.5 Buthinore, Maryland 56.0 Boston, Massachusetts 55.4 Buffialo, New York 57.0 Canby, Fort, Washington* 60.9 Cedur Keys, Florida 86.5 Charleston, South Carolina 50.2 Chicago, Illinois 55.8 Chincoteague, Virginia 76.9 Cleveland, Ohio. 55.8 Detroit, Michigan 60.4 Delaware Breakwater, Delaware 67.0 Duluth, Minnesota 55.1 Galveston, Texas 82.0 Garand Haven, Michigan 66.2 Indianola, Texas 82.0 Indianola, Texas 82.0 Maryneite, Florida 84.9 Key West, Florida 87.7 Mackinaw City, Michigan 57.8 Macon, Fort, North Carolina, 77.0 Marqueite, Michigan 52.1 Mobile, Alabama 81.5 New Haven, Connecticut 62.2 New York City 60.9 New York City 60.9 New York City 60.9 New York City 60.9 New Jondon, Connecticut 62.2 New Haven, Connecticut 62.2 New York City 60.9 Neroland, Maine 75.4 Pensacola, Florida 77.3 Portland, Oregon 61.7 Sandy Hook, New Jersey 56.8 San Francisco, California* 59.7 Savannah, Georgia 50.7 Savannah, Georgia 75.0 Smithville, North Carolina 75.0	Temperature at bottom.		Average depth, feet and	Mean tempera- ture of the
Atlantic City, New Jersey	Min.		inches.	air at station.
Alpena, Michigan	•	0	ft, in,	
Alpena, Michigan	49.5	16.5	5 1	58.7
Augusta, Georgia         80.5           Baltimore, Maryland         68.5           Baltimore, Maryland         68.5           Block Island, Rhode Island         56.0           Boston, Massachusetts         55.4           Buffalo, New York         57.0           Camby, Fort, Washington*         66.9           Canby, Fort, Washington*         86.5           Charleston, South Carolina         80.2           Chiracotagne, Virginia         76.9           Chiracotagne, Virginia         76.9           Cleveland, Ohio         58.8           Detroit, Michigan         60.4           Delaware Breakwater, Delaware         67.0           Duluth, Minnesota*         44.2           Eastport, Maine         40.2           Eastport, Maine         82.0           Galveston, Texas         82.0           Garand Haven, Michigan         55.1           Mackinand, Texas         82.0           Jacksonville, Florida         84.9           Key West, Florida         87.7           Marquete, Michigan         57.7           Marquete, Michigan         51.8           Macon, Fort, North Carolins         77.0           Marquete, Wisconsin         52.1	41.5	20.0	12 1	48.5
Baltimore, Maryland         68.5           Block Island, Rhode Island         56.0           Boston, Massachusetts         55.4           Buffalo, New York         57.0           Canlby, Fort, Washington*         66.9           Cedar Keys, Florida         86.5           Chiraleston, South Carolina         50.2           Chicago, Illinois         55.8           Chiractrague, Virginia         70.9           Cleveland, Ohio         55.8           Detroit, Michigan         60.4           Delaware Breakwater, Delaware         67.0           Duluth, Minnesota **         41.2           Eastport, Maine         40.2           Eastport, Maine         55.1           Galveston, Texas         82.0           Indianola, Texas         82.0           Jacksonville, Florida         84.9           Key West, Florida         87.7           Mascum, Fort, North Carolina         77.0           Markinaw City, Michigan         51.8           Macon, Fort, North Carolina         77.0           Marynete, Michigan*         52.1           Mobile, Alabama         81.5           New London, Connecticut         62.2           New London, Connecticut <t< td=""><td>60.0</td><td>20.5</td><td>7 11</td><td>74.0</td></t<>	60.0	20.5	7 11	74.0
Block Island, Rhode Island	57 - 4	11.1		64.8
Boston   Massachusetts   55.4	44.9	11.1	9 7 8 8	55.0
Buffalo, New York         57.0           Canby, Fort, Washington*         60.9           Cedar Keys, Florida         86.5           Charleston, South Carolina         50.2           Chicago, Illinois         55.8           Chirotevalina         76.9           Chirotevalina         60.4           Chirotevalina         60.4           Delaware Wirginia         60.4           Delaware Breakwater, Delaware         67.0           Duluth, Minnesota*         41.2           Eastport, Maine         40.2           Eastaport, Michigan         55.1           Galveston, Texus         82.0           Grand Haven, Michigan         55.1           Galveston, Texus         82.0           Jacksonville, Florida         87.7           Mackinsw City, Michigan         57.7           Mackinsw City, Michigan         57.8           Macynete, Michigane         38.0           Marynete, Michigane         38.0           Marynete, Michigane         52.1           Mobile, Alabama         81.5           New London, Connecticut         62.2           New Haven, Connecticut         62.2           New York City         60.9 <td< td=""><td>46.1</td><td>9.3</td><td>21 6</td><td>53.8</td></td<>	46.1	9.3	21 6	53.8
Canby, Fort, Washington*       66.9         Cedar Keys, Florida       86.5         Charleston, South Carolina       80.2         Chicago, Illinois       55.8         Chincuteagne, Virginia       70.9         Cleveland, Ohio       58.8         Detroit, Michigan       60.4         Delaware Breakwater, Delaware       67.0         Duluth, Minnesota*       44.2         Essatport, Maine       40.2         Escanaba, Michigan       55.1         Galveston, Texas       82.0         Grand Haven, Michigan       82.0         Jacksonville, Florida       84.9         Key West, Florida       87.7         Mackinaw City, Michigan       51.8         Macon, Fort, North Carolins       77.0         Marqueete, Michigan       52.1         Mobile, Alabama       81.5         New Haven, Connecticut       55.0         New London, Connecticut       55.0         New London, Connecticut       55.0         New London, Wirginia       77.3         Pensacola, Florida       77.3         Pensacola, Florida       77.3         Portland, Oregon       50.9         Sandy Hook, New Jersey       56.8 <tr< td=""><td>32.9</td><td>24.1</td><td></td><td>52.1</td></tr<>	32.9	24.1		52.1
Cedar Keys, Florida         86.5           Charleston, South Carolina         80.2           Chicago, Illinois         55.8           Chicocteague, Virginia         76.9           Cleveland, Ohio.         55.8           Detroit, Michigan         60.4           Delaware Breakwater, Delaware         67.0           Duluth, Minnesota         41.2           Eastport, Maine         40.2           Eastport, Maine         82.0           Galveston, Texas         82.0           Galveston, Texas         82.0           Indianola, Texas         82.0           Jacksonville, Florida         87.7           Mackinaw City, Michigan         51.8           Macrou, Fort, North Carolina         77.0           Marqueite, Michigan <sup>6</sup> 33.0           Marqueite, Michigan         52.1           Mobile, Alabama         81.5           New Haven, Connecticut         62.2           New London, Connecticut         55.0           New York City         60.9           New London, Connecticut         55.0           New York City         60.9           New Condon, Connecticut         55.0           New Jork City         60.9	48.5	18.4		
Charleston, South Carolina   So.2	76.5	10.0	15 8 8 10	53-4
Chicago, Illinois	68.7	11.5	42 8	77.9
Chincoteague   Virginia   76.9   58.8     Detroit, Michigan   60.4     Delaware Breakwater, Delaware   67.0     Duluth, Minnesota   44.2     Eastport, Maine   44.2     Eastport, Maine   49.2     Eastport, Minnesota   49.2     Eastport, Maine   49.2     Eastport, Maine   49.2     Eastport, Minnesota   49.2     Eastport, Texas   49.2     Eastport, Michigan   55.1     Eastport, Eastern   58.2     Mackon   19.1     Macon, Fort, North Carolina   77.0     Marquerte, Michigan   51.8     Macon, Fort, North Carolina   77.0     Marquerte, Michigan   51.5     New London, Connecticut   62.2     New London, Connecticut   55.0     New London, Connecticut   55.0     New London, Connecticut   57.4     Pensacola, Florida   77.3     Perstand, Maine   50.9     Portland, Oregon   61.7     Sandy Hook, New Jersey   56.8     San Francisco, California*   59.7     Sayannah, Georgia   87.2     California*   59.7     Sayannah, Georgia   87.2     California*   59.7     California*   59.7	46.3		8 7	74.8
Cleveland, Ohio	56.7	9.5		56.7
Detroit, Michigan		20.2	4 3 14 0	61.7
Delaware Breakwater, Delaware         67.0           Duluth, Minnesota °         41.2           Eastport, Maine         40.2           Escanaba, Michigan         55.1           Galveston, Texas         82.0           Grand Haven, Michigan         82.0           Jacksouville, Florida         84.9           Key West, Florida         87.7           Mackinaw City, Michigan         55.18           Macon, Fort, North Carolins         77.0           Marqueete, Michigan°         33.0           Milwaukee, Wisconsin         52.1           Mobile, Alabama         81.5           New Haven, Connecticut         55.0           New York City         00.9           Norfolk, Virginia         77.3           Pensacola, Florida         77.3           Portland, Oregon         51.7           Sandy Hook, New Jersey         56.8           San Francisco, California*         37.2           Savannah, Georgia         37.2	45.5 48.2	13.3		57.7
Duluth, Minnesota	48.7	12.2	-0 0	58,9
Eastport, Maine       40.2         Eastanaba, Michigan       55.1         Galveston, Texas       82.0         Grand Haven, Michigan       66.2         Indianola, Texas       82.0         Jacksonville, Florida       84.9         Key West, Florida       87.7         Mackinaw City, Michigan       51.8         Macon, Fort, North Carolins       77.0         Marquette, Michigan       35.0         Milwaukee, Wisconstin       52.1         Mobile, Alabama       81.5         New Haven, Connecticut       62.2         New Howen, Connecticut       55.0         New York City       00.9         Norfolk, Virginia       77.3         Pensacola, Florida       77.3         Portland, Oregon       50.9         Portland, Maine       50.9         Portland, Maine       50.9         Portland, Maine       50.9         Sandsky, Ohio       65.0         Sandy Hook, New Jersey       55.8         San Francisco, California*       87.2         Savannah, Georgia       87.2	49.7	18.3		60.0
Escalabai, Michigan         55.1           Galveston, Texas         82.0           Grand Haven, Michigan         66.2           Indianola, Texas         82.0           Jacksouville, Florida         84.9           Key West, Florida         87.7           Mackinaw City, Michigan         51.8           Macon, Fort, North Carolins         77.0           Marqueire, Michigan         35.0           Marqueire, Michigan         52.1           Mobile, Alabama         81.5           New Haven, Connecticut         52.1           New London, Connecticut         55.0           New Vork City         00.9           New Vork City         07.4           Pensacola, Florida         77.3           Portland, Oregon         51.7           Sandy Hook, New Jersey         56.8           San Francisco, California*         59.7           Savannah, Georgia         81.2	38.5	2.7		45.9
Grand Haven, Michigan       66.2         Indianola, Texas       82.0         Jacksouville, Florida       84.9         Key West, Florida       87.7         Mackinaw City, Michigan       55.8         Macon, Fort, North Carolins       77.0         Marqueite, Michigan       35.0         Milwaukee, Wisconsin       52.1         Mobile, Alabama       81.5         New Haven, Connecticut       52.2         New London, Connecticut       55.0         New York City       00.9         Norfolk, Virginia       77.3         Pensacola, Florida       77.3         Portland, Oregon       51.7         Sandy Hook, New Jersey       56.8         San Francisco, California*       59.7         Savannah, Georgia       83.2	37 • 3	2.9	-0	46.5
Grand Haven, Michigan       66.2         Indianola, Texas       82.0         Jacksouville, Florida       84.9         Key West, Florida       87.7         Mackinaw City, Michigan       55.8         Macon, Fort, North Carolins       77.0         Marqueite, Michigan       35.0         Milwaukee, Wisconsin       52.1         Mobile, Alabama       81.5         New Haven, Connecticut       52.2         New London, Connecticut       55.0         New York City       00.9         Norfolk, Virginia       77.3         Pensacola, Florida       77.3         Portland, Oregon       51.7         Sandy Hook, New Jersey       56.8         San Francisco, California*       59.7         Savannah, Georgia       83.2	34.9	20.2	17 11	49.1
Indianola, Texas	71.4	10.0	12 2	75.9
Jacksonville, Florida       \$4.9         Key West, Florida       \$7.7         Mackinsw City, Michigan       51.8         Macon, Fort, North Carolins       77.0         Marquette, Michigan       33.0         Milwaukee, Wisconsin       \$2.1         Mobile, Alabama       \$1.5         New Haven, Connecticut       \$2.2         New London, Connecticut       55.0         New York City       \$0.9         Norfolk, Virginia       75.4         Pensacola, Florida       77.3         Portland, Maine       50.9         Portland, Maine       \$5.9         Portland, Oregon       \$1.7         Sandsky, Ohio       \$5.0         Sandy Hook, New Jersey       \$5.8         San Francisco, Callifornia*       \$9.7         Sayavanah, Georgia       \$3.2	57.0	9.2	19	55.1
Key West, Florida         \$7,7           Mackinaw City, Michigan         51.8           Macon, Fort, North Carolins         77.0           Marqueire, Michigan         35.0           Marqueire, Wisconsin         52.1           Mobile Alabama         81.5           New Haven, Connecticut         62.2           New London, Connecticut         55.0           New York City         00.9           Norfolk, Virginia         75.4           Pensacola, Florida         77.3           Portland, Oregon         51.7           Sandy Hook, New Jersey         55.8           San Francisco, California*         59.7           Savannah, Georgia         82	00.9	15.1	9 I 18	75.4
Mackinew City, Michigan       51.8         Macon, Fort, North Carolins       77.0         Marquerte, Michigan <sup>6</sup> 33.0         Milwankee, Wisconsin       52.1         Mobile, Alabama       81.5         New Haven, Connecticut       62.2         New London, Connecticut       55.0         New York City       60.9         Norfolk, Virginia       75.4         Pensacola, Florida       77.3         Portland, Maine       50.9         Portland, Oregon       51.7         Sandrsky, Ohio       65.0         Sandy Hook, New Jersey       56.8         San Francisco, Callifornia*       59.7         Savannah, Georgia       81.2	75-4	9.5		76.
Macon, Fort, North Carolins.       77.5         Marquette, Michigan*       35.0         Milwaukee, Wisconsin       52.1         Mobile, Alabama.       81.5         New Haven, Connecticut       52.2         New London, Connecticut       55.0         New York City.       60.9         Norfolk, Virginia.       75.4         Pensacola, Florida.       77.3         Portland, Maine       50.9         Portland, Oregon       51.7         Sandy Hook, New Jersey.       55.8         San Francisco, California*       59.7         Savannah, Georgia       82.2	79.2	8.5	17 4	80.9
Marqueite, Michigane     33.0       Milwankee, Wisconsin     52.1       Mobile, Alabama     81.5       New Haven, Connecticut     62.2       New London, Connecticut     55.0       New York City     60.9       Norfolk, Virginia     75.4       Pensacola, Florida     77.3       Portland, Maine     50.9       Portland, Oregon     61.7       Sandy Hook, New Jersey     56.8       San Francisco, California*     59.7       Savannah, Georgia     87.2	37.0	14.8	10	47.7
Milwankee, Wisconsin       52.1         Mobile, Alabama       81.5         New Haven, Connecticut       62.2         New London, Connecticut       55.0         New York City       60.9         Norfolk, Virginia       75.4         Pensacola, Florida       77.3         Portland, Maine       50.9         Portland, Oregon       51.7         Sandusky, Ohio       65.0         Sandy Huok, New Jersey       50.8         San Francisco, California*       59.7         Sayannah, Georgia       87.2	62.5	14.5	68	64.3
Mobile Alubama   St. 5	34.7	3.3	9 11	47.2
New Haven, Connecticut     62.2       New London, Connecticut     55.0       New York City     60.9       Norfolk, Virginia     75.4       Pensacola, Florida     77.3       Portland, Maine     50.9       Portland, Oregon     51.7       Sandusky, Ohio     65.0       Sandy Hook, New Jersey     56.8       San Francisco, California*     59.7       Savannak, Georgia     31.2	45.1	7.0	8 0	53 -
New London, Connecticut       55.0         New York City       60.9         Norfolk, Virginia       75.4         Penascola, Florida       77.3         Portland, Maine       50.9         Portland, Oregon       51.7         Sandusky, Ohio       65.0         Sandy Hook, New Jersey       56.8         San Francisco, California*       59.7         Sayannah, Georgia       33.2	68.5	13.0	16 3 15 8	74.6
New York City         60.9           Norfolk, Virginia         75.4           Pensacola, Florida         77.3           Portland, Maine         50.9           Portland, Oregon         61.7           sandusky, Ohio         65.0           sandy Hook, New Jersey         56.8           san Francisco, California*         59.7           savannah, Georgia         31.2	49.2	13.0		55.9
New York City	44.0	0.11	12 8	55.8
Norfolk, Virginia	50.5	9.5	16 4	55.8
Pensacoln, Florida       77.3         Portland, Maine       59.9         Portland, Oregon       61.7         Sandnsky, Ohio       65.0         Santy Houk, New Jersey       56.8         San Francisco, California*       59.7         Savannah, Georgia       81.2	61.6	13.8	10 10	68.
Portland, Maine     50.9       Portland, Oregon     61.7       Sandusky, Ohio     65.0       Sandy Hook, New Jersey     56.8       San Francisco, California*     59.7       Savannah, Georgia     31.2	71.1	6.2	17 5	74.2
Portland, Oregon         51.7           Sandusky, Ohio         65.0           Sandy Hook, New Jersey         55.8           San Francisco, California*         59.7           Savannah, Georgia         33.2	42.5	8.4	ıó 7	53 - 9
Sandusky, Ohio	51,0	10.7	62 10	59.8
Sandy Hook, New Jersey       56.8         San Francisco, California*       59.7         Savannah, Georgia       81.2	54.0	11.0	II 2	59.6
San Francisco, California*	47.3	9.5	1 6	58.9
Savannah, Georgia Sr 2	50.2	3.5	39 I	58 2
Smith with Nameh Chambian	65.7	15.6	10 3	76.1
	66.8	11.2	11 1	71.5
Toledo, Ohio	56.2	13.0	12 0	59.8
Wilmington, North Carolina	62.8	14.8		71.5

 $<sup>\</sup>pmb{\ast}$  Reports incomplete; see text.

# ATMOSPHERIC ELECTRICITY. AURORAS.

The only auroral display of the month, observed at more than one place, was that which occurred during the early morning of the 1st; and it was only observed at a few of the more northerly stations between New Hampshire and Dakota, as will be seen from the following reports:

Mount Washington, New Hampshire: a faint auroral display was observed from 1.30 a.m. of the 1st until daylight; it consisted of indistinct streamers extending upward 50°; no arch

was visible.

Boston, Massachusetts: from 2 a. m. until daylight of the 1st, was observed a very brilliant auroral display in the form of an arch with streamers of light red color. The arch extended over about 40° of the northern sky and to an altitude of 45°.